

WHAT IS CLAIMED IS:

1. An olefin polymerization catalyst, having a solid catalyst component and an organoaluminum compound, comprising:

(A) a solid catalyst component being prepared by

copulverizing a magnesium compound, said magnesium

compound is represented by the general formula

$Mg(OR)_{2-n}X_n$  wherein R is an alkyl radical containing up to

12 carbon atoms,  $1 \leq n \leq 2$  and X is a halogen atom; an

aluminum compound, said aluminum compound represented

by the general formula  $Al(OR')_3$  wherein R' is an alkyl

radical containing up to 12 carbon atoms or an aryl group; an

electron donor from organic compounds which contain at

least one atom selected from oxygen, silicon, nitrogen, sulfur

and phosphorus atoms, and a titanium compound; and

(B) an organoaluminum compound.

2. A catalyst according to claim 1 wherein said magnesium compound is selected from the group consisting of magnesium dichloride, magnesium dibromide, magnesium difluoride, magnesium diiodide, magnesium ethoxychloride, magnesium methoxychloride and magnesium isopropoxychloride.

3. A catalyst according to claim 2 wherein said magnesium compound is magnesium dichloride.
4. The catalyst according to claim 1 wherein said aluminum compound is represented by the general formula  
5  $\text{Al}(\text{OR}^1)_r(\text{OR}^2)_s$  wherein  $\text{R}^1$  and  $\text{R}^2$  are different and are each alkyl radicals containing up to 12 carbon atoms or an aryl group, and  $r+s = 3$ .
5. A catalyst according to claim 1 wherein said aluminum compound is represented by the general formula  $\text{Al}(\text{OR}')_3$   
10 wherein  $\text{R}'$  is an alkyl radical containing up to 12 carbon atoms.
6. A catalyst according to claim 5 wherein said aluminum compound is selected from the group consisting of aluminum  
15 trimethoxide, aluminum triethoxide, aluminum tri-n-propoxide, aluminum triisopropoxide, aluminum tri-n-butoxide, aluminum tri-sec-butoxide, aluminum tri-t-butoxide, diethoxyaluminum butoxide, ethoxyaluminum  
20 dibutoxide and aluminum phenoxide.

7. The catalyst according to claim 6 wherein said aluminum compound is selected from the group consisting of aluminum triethoxide and aluminum trimethoxide.
- 5 8. A catalyst according to claim 1 wherein said electron donor is selected from the groups consisting of ethers, alcohols, esters, ketones, silanes, amines, acyl halides, phosphines, and phosphine amides.
- 10 9. A catalyst according to claim 8 wherein said esters are saturated or unsaturated eaters represented by the formula  $R^1COOR^2$  wherein  $R^1$  and  $R^2$  each is alkyl, alkenyl, aralkyl, cycloalkyl or aryl, or those substituted with halogen, or cyclic esters.
- 15 10. A catalyst according to claim 9 wherein said esters are selected from the group consisting of butyl formate, ethyl acetate, butyl acetate, ethyl acrylate, ethyl butyrate, isobutyl isobutyrate, methyl methacrylate, diethyl maleate, diethyl tartrate, ethyl cyclohexanecarbonate, ethyl benzoate, ethyl p-methoxybenoate, methyl p-methylbenzoate, ethyl p-tert-butylbenzoate, dialkyl phthalate, dially phthalate, and ethyl alpha-naphthoate.
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11. A catalyst according to claim 8 wherein silanes are selected  
from the group consisting of tetrahydrocarbylsilanes and their  
halogen or alkoxy derivatives, linear or cyclic  
5 organopolysilanes, siloxane polymers, and other silicon-  
containing organic compounds.
12. A catalyst according to claim 11 wherein said silanes are  
selected from the group consisting of tetramethylsilane,  
10 trimethylphenylsilane, diethyldichlorosilane,  
phenyltrichlorosilane, diphenyldichlorosilane,  
trimethoxymethylsilane, diphenyldimethoxysilane,  
dimethyldiethoxysilane, diethyldiethoxysilane,  
triphenylethoxysilane, hexaphenyldisilane,  
15 dimethylpolysiloxane, diphenylpolysiloxane, and 2-  
(trimethoxysilyethyl)pyridine.
13. A catalyst according to claim 1 wherein said titanium  
compound is represented by the formula  $\text{Ti}(\text{OR}')_{4-p}\text{X}_p$   
20 wherein  $\text{R}'$  is an alkyl radical containing up to 12 carbon  
atoms,  $1 \leq p \leq 4$  and X is a halogen atom.

14. A catalyst according to claim 15 wherein said titanium  
compound is selected from the group consisting of titanium  
tetrachloride, triethoxytitanium chloride, diethoxytitanium  
dichloride, tributoxytitanium chloride, dibutoxytitanium  
5 dichloride, butoxytitanium trichloride and ethoxytitanium  
trichloride.
15. A catalyst according to claim 1 wherein said catalyst  
components have ratios of: the mole ratio of the aluminum  
10 compound to the magnesium compound from 0.005:1 to 1:1,  
the mole ratio of the electron donor to the magnesium  
compound from 0.005:1 to 1:1, and the amount of titanium in  
the resulting solid from 0.5 to 10 % by weight.
- 15 16. A catalyst according to claim 1 wherein said organoaluminum  
compound is represented by the formula  $AlR'''_qY_{3-q}$  wherein  
 $R'''$  represents hydrogen or an alkyl radical containing up to  
12 carbon atoms, Y represents a halogen or an alkoxy group  
having from about 1 to 12 carbon atoms and q is in a range of  
20  $1 \leq q \leq 3$ .
17. A catalyst according to claim 16 wherein said  
organoaluminum compound is selected from the group

consisting of triethylaluminum, tri-n-propylaluminum, tri-iso-butylaluminum, tri-n-octylaluminum, tri(2-methylpentyl)aluminum, di-iso-butylaluminum hydride, ethylaluminum sesquichloride, diethylaluminum chloride, ethylaluminum dichloride, diethylaluminum ethoxide, diethylaluminum iodide, methylaluminoxane, and ethylaluminoxane, and among them triethylaluminum is particularly preferable.

18. A catalyst according to claim 1 wherein the molar ratio of the organoaluminum compound to the metal titanium in the solid catalyst component A may range 1000:1 to 0.5:1.

19. A process for polymerization of olefins selected from the group consisting of ethylene, propylene, 1-butene, 1-pentene, 1-hexene, 1-heptene, 1-octene, 1-nonene, 1-decene, 1-methyl-1-pentene, 4-methyl-1-heptene, 5-methyl-1-heptene, 6-methyl-1-heptene, and 4,4-dimethyl-1-hexene, which comprises: reacting at least one of said olefins at elevated temperature in the presence of a catalyst, said catalyst being

(A) a solid catalyst component being prepared by copulverizing a magnesium compound, an aluminum compound, an electron donor selected from organic compounds which contain at least one atom selected from

oxygen, silicon, nitrogen, sulfur and phosphorus atoms, and a titanium compound; and

(B) an organoaluminum compound.

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20. A process according to claim 19 wherein said polymerization is conducted at a temperature in a range from 20 °C to 300 °C and a pressure in a range of 1 to 80 bar.